WHAT IS CLAIMED IS:

Sub-A2

~~1. A targeted molecular bar code comprising:~~

~~(a) a molecular bar code, wherein said molecular bar code is a charged polymer capable of generating a reproducible signal upon passage through a nanopore; and~~

~~(b) a member of a specific binding pair, wherein said specific binding pair member is joined directly or through a linking group to said molecular bar code.~~

2. The targeted molecular bar code of Claim 1, wherein said charged polymer is negatively charged.

Sub B2

~~3. The targeted molecular bar code according to Claim 2, wherein said negatively charged polymer is made up of monomeric units that comprise a moiety selected from the group consisting of a phosphate group or a phosphorothioate group.~~

~~4. The targeted molecular bar code according to Claim 2, wherein said polymer is a block copolymer of a plurality of blocks, wherein said plurality of blocks are selected from two or more different blocks.~~

Sub. A3

~~5. The targeted molecular bar code according to Claim 4, wherein said block copolymer comprises three different blocks.~~

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6. The targeted molecular bar code according to Claim 1, wherein said molecular bar code comprises a linking group.

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~~7.~~ The targeted molecular bar code according to Claim ~~6,~~ wherein said linking group is a photocleavable linking group.

Sub B3

~~8. A targeted molecular bar code comprising:~~

(a) a negatively charged block copolymer of from one to twenty blocks, wherein said blocks are selected from two or more different blocks, wherein each block consists of monomeric units comprising a phosphate group; and

(b) a member of a specific binding pair, wherein said member of a specific binding pair is joined to said negatively charged block copolymer through a linking group.

13 ~~9~~. The targeted molecular bar code according to Claim ~~8~~ 12, wherein said blocks are selected from two to four different blocks.

Sub-B4

~~10.~~ The targeted molecular bar code according to Claim 8, wherein each block is a homopolymer of monomeric units ~~selected from the~~ group consisting of phosphates and sugar phosphates.

Sub. A4

~~11.~~ The targeted molecular bar code according to Claim 8, wherein said sugar phosphates are ~~selected~~ from the group consisting of ribose phosphates and deoxyribose phosphates.

16 ~~12~~. The targeted molecular bar code according to Claim ~~11~~ 15, wherein said sugar phosphates may optionally comprise a heterocyclic nitrogenous base.

17 ~~13~~. The targeted molecular bar code according to Claim ~~12~~ 16, wherein said heterocyclic nitrogenous base is a purine or a pyrimidine.

Sub-A5

~~14. The targeted molecular bar code according to Claim 8, wherein the length of each block of said block copolymer ranges from 15 to 25 nm.~~

19 ~~15~~. The targeted molecular bar code according to Claim ~~14~~ 18, wherein said linker is a photocleavable linker.

Sub B5

~~16. A targeted molecular bar code comprising:~~

(a) a negatively charged block copolymer of from two to twenty blocks, wherein said blocks are selected from a group of three different blocks, wherein each block is a homopolymer of monomeric units selected from the group consisting of polyphosphates, oligonucleotides, oligodeoxyribosephosphates; and polyethylene glycol-phosphodiesters;

(b) a member of a specific binding pair, wherein said member of a specific binding pair is joined to said negatively charged block copolymer through a linking group.

21 ~~17~~. The targeted molecular bar code according to Claim 20 ~~16~~, wherein said three different blocks are: polyethylene glycol-phosphodiesters; oligodeoxyribosephosphates; and oligonucleotides modified to prevent Watson-Crick base pairing.

22 ~~18~~. The targeted molecular bar code according to Claim 20 ~~16~~, wherein each of said blocks is about 20 nm long.

23 ~~19~~. The targeted molecular bar code according to Claim 20 ~~16~~, wherein said linker is a photocleavable linker.

~~20~~. A method for detecting the presence of an analyte in a sample, said method comprising:

(a) contacting said sample with at least one targeted molecular bar code according to Claim 1 under conditions sufficient for said specific binding pair to bind to said analyte in said sample;

(b) separating unbound targeted molecular bar code from analyte-bound targeted molecular bar code;

(c) treating said analyte bound targeted molecular bar code in a manner sufficient to release said molecular bar code from said analyte-bound targeted molecular bar code and produce free molecular bar code;

(e) detecting the presence of said free molecular bar code; and

(f) relating the presence of said free molecular bar code to the presence of said analyte in said sample.

21. The method according to Claim 20, wherein said detecting step comprises translocating said free molecular bar code through a nanopore.

22. The method according to Claim 21, wherein said detecting step further comprises observing the current blockade effect of said translocation on said nanopore.

23. The method according to Claim 20, wherein said method comprises contacting a plurality of different targeted molecular bar codes with said sample.

24. The method according to Claim 23, wherein said sample size does not exceed the size of a biological cell.

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7 ~~25~~. A kit for use in the detection of an analyte in a sample, said kit comprising: a targeted molecular bar code according to Claim 1.

8 ~~26~~. The kit according to Claim ~~25~~ 7, wherein said kit comprises a plurality of different targeted molecular bar codes.

9 ~~27~~. The kit according to Claim ~~25~~ 7, wherein said kit comprises at least 4 different types of targeted molecular bar codes.

10 ~~28~~. The kit according to Claim ~~25~~ 7, wherein said kit comprises at least 64 different types of targeted molecular bar codes.

11 ~~29~~. The kit according to Claim ~~25~~ 7, wherein said kit comprises at least 100 different types of targeted molecular bar codes.

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